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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,836	03/08/2004	Andras Kuthi	LAM1P077A2	2484

25920 7590 11/16/2005

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/796,836	Applicant(s) KUTHI ET AL.	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. §.133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

The finality indicated in the office action mailed 03/18/05 withdrawn in view of the newly stated rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al., U.S. Patent 5,593,540 in view of Chang et al., U.S. Patent 4,854,263.

Tomita et al. shows the invention substantially as claimed including an apparatus comprising: an electrode 3 capable of being positioned over a substrate location W, the electrode having a center region, a first surface and a second surface, the first surface being configured to receive processing gases through an inlet 55 and to enable flow of the processing gases through the center region, the second surface having a plurality of gas feed holes that are coupled to a corresponding plurality of electrode openings, the plurality of electrode openings being configured to define the second surface which is located over the substrate location, the second surface having a surface area that is larger than a surface area of the substrate location, the larger surface area being capable of inducing an increased bias voltage at a point closer to the substrate location and a decreased bias voltage at a point closer to the second surface of the electrode when a plasma is struck in a space defined between the second surface and the substrate location (see figs. 1-4 and col. 3-line 40 to col. 5-line 60). Note that inherently the plasma sheath will form within the inlet openings 55 to form the second plasma sheath surface area since the openings have an opening diameter of 0.6mm (see applicant's specification at page 13, lines 22-24 and col. 5-lines 3-5 of Tomita et al.).

Tomita et al. fails to expressly disclose where the electrode opening diameters are greater than the gas feed hole diameters. Chang et al. discloses an electrode which has been formed so as to comprise gas feed holes 33 that lead to a plurality of electrode openings 31, the electrode openings having diameters that are greater than gas feed hole diameters of the plurality of gas feed holes in order to enhance dissociation and reactivity of the gases (see col. 5-lines 33-53 and figs. 1-3). In view of

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this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Tomita et al. as to comprise electrode openings having diameters that are greater than gas feed hole diameters of the plurality of gas feed openings because this would enhance dissociation and reactivity of the gases.

With respect to claims 2-3, 6-7, and 10, note that in Tomita et al. the first plasma sheath surface is defined next to the substrate location and a second plasma sheath surface is defined next to the second surface, and the second plasma sheath surface follows an outline defined by the plurality of electrode openings of the second surface of the electrode, and has a larger surface area than the first plasma sheath surface.

Concerning claims 4, 8, and 12, Tomita et al. and Chang do not disclose that the gas feed holes have a diameter of 0.1mm and the second plasma sheath surface is about 2.7 times greater than the first plasma sheath surface, but it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize through routine experimentation the gas feed hole diameter and the relative surface area of the first and second plasma sheath areas depending upon a variety of factors, for example, the particular size of the semiconductor being processed, and therefore the claimed dimensions would not lend patentability to the instant application absent the showing of unexpected results.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al., U.S. Patent 4,854,263 in view of Tomita et al., U.S. Patent 5,593,540.

Chang et al. shows the invention substantially as claimed including an apparatus comprising: an electrode capable of being positioned over a substrate location 12, an electrode which has been formed so as to comprise gas feed holes 33 that lead to a plurality of electrode openings 31, the electrode openings having diameters that are greater than gas feed hole diameters of the plurality of gas feed holes in order to enhance dissociation and reactivity of the gases (see col. 5-lines 33-53 and figs. 1-3).

Chang et al. does not expressly disclose the electrode having a center region, a first surface and a second surface, the first surface being configured to receive processing gases through an inlet 55 and to enable flow of the processing gases through the center region, the second surface having a plurality of gas feed holes that are coupled to a corresponding plurality of electrode openings, the plurality of electrode openings being configured to define the second surface which is located over the substrate location, the second surface having a surface area that is larger than a surface area of the substrate location, the larger surface area being capable of inducing an increased bias voltage at a point closer to the substrate location and a decreased bias voltage at a point closer to the second surface of the electrode when a plasma is struck in a space defined between the second surface and the substrate location (see figs. 1-4 and col. 3-line 40 to col. 5-line 60).

Tomita et al. discloses the electrode having a center region, a first surface and a second surface, the first surface being configured to receive processing gases through an inlet 55 and to enable flow of the processing gases through the center region, the second surface having a plurality of gas feed holes that are coupled to a corresponding

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plurality of electrode openings, the plurality of electrode openings being configured to define the second surface which is located over the substrate location, the second surface having a surface area that is larger than a surface area of the substrate location, the larger surface area being capable of inducing an increased bias voltage at a point closer to the substrate location and a decreased bias voltage at a point closer to the second surface of the electrode when a plasma is struck in a space defined between the second surface and the substrate location (see figs. 1-4 and col. 3-line 40 to col. 5-line 60). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Chang et al. so as to include the electrode of Tomita et al. because such an electrode configuration will allow for adequate introduction of the gases into the processing chamber.

Note that inherently the plasma sheath in Tomita et al. will form within the inlet openings 55 to form the second plasma sheath surface area since the openings have an opening diameter of 0.6mm (see applicant's specification at page 13, lines 22-24 and col. 5-lines 3-5 of Tomita et al.).

With respect to claims 2-3, 6-7, and 10, note that in Tomita et al. the first plasma sheath surface is defined next to the substrate location and a second plasma sheath surface is defined next to the second surface, and the second plasma sheath surface follows an outline defined by the plurality of electrode openings of the second surface of the electrode, and has a larger surface area than the first plasma sheath surface.

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Concerning claims 4, 8, and 12, Chang and Tomita et al. do not disclose that the gas feed holes have a diameter of 0.1mm and the second plasma sheath surface is about 2.7 times greater than the first plasma sheath surface, but it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize through routine experimentation the gas feed hole diameter and the relative surface area of the first and second plasma sheath areas depending upon a variety of factors, for example, the particular size of the semiconductor being processed, and therefore the claimed dimensions would not lend patentability to the instant application absent the showing of unexpected results.

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Luz L. Alejandro
Primary Examiner
Art Unit 1763

November 8, 2005